查询IDT54FCT139ATD供应商

Integrated Device Technology, Inc.

FAST CMOS DUAL 1-OF-4 DECODER WITH ENABLE

IDT54/74FCT139T/AT/CT

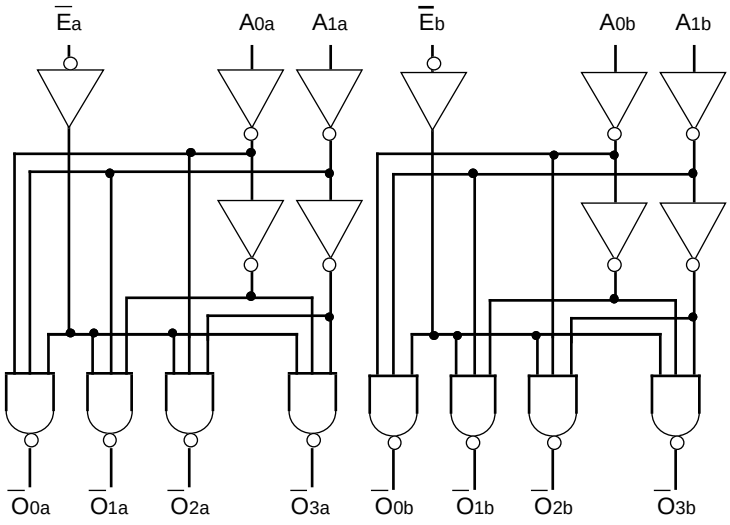
FEATURES:

- Std., A and C speed grades
- Low input and output leakage ≤1µA (max.)
- CMOS power levels
- True TTL input and output compatibility
  - V_{OH} = 3.3V (typ.)
  - V_{OL} = 0.3V (typ.)
- High drive outputs (-15mA I_{OH}, 48mA I_{OL})
- Meets or exceeds JEDEC standard 18 specifications
- Product available in Radiation Tolerant and Radiation Enhanced versions
- Military product compliant to MIL-STD-883, Class B and DESC listed (dual marked)
- Available in DIP, SOIC, QSOP, CERPACK and LCC packages

DESCRIPTION:

The IDT54/74FCT139T/AT/CT are dual 1-of-4 decoders built using an advanced dual metal CMOS technology. These devices have two independent decoders, each of which accept two binary weighted inputs (A_0-A_1) and provide four mutually exclusive active LOW outputs ($\overline{O}_0$-$\overline{O}_3$). Each decoder has an active LOW enable ($\overline{E}$). When $\overline{E}$ is HIGH, all outputs are forced HIGH.

FUNCTIONAL BLOCK DIAGRAM



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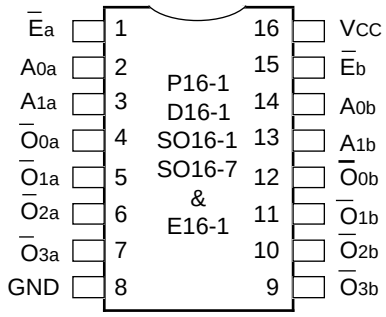
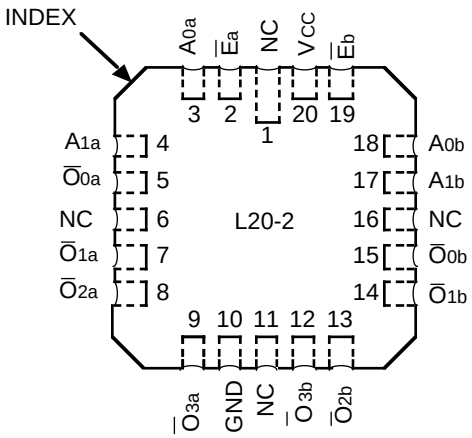
PIN CONFIGURATIONS



DIP/SOIC/QSOP/CERPACK
TOP VIEW

2566 drw 02



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LCC
TOP VIEW

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ABSOLUTE MAXIMUM RATINGS(1)

Symbol	Rating	Commercial	Military	Unit
V_{TERM}(2)	Terminal Voltage with Respect to GND	–0.5 to +7.0	–0.5 to +7.0	V
V_{TERM}(3)	Terminal Voltage with Respect to GND	–0.5 to V_{CC} +0.5	–0.5 to V_{CC} +0.5	V
T_A	Operating Temperature	0 to +70	–55 to +125	°C
T_{BIAS}	Temperature Under Bias	–55 to +125	–65 to +135	°C
T_{STG}	Storage Temperature	–55 to +125	–65 to +150	°C
P_T	Power Dissipation	0.5	0.5	W
I_{OUT}	DC Output Current	–60 to +120	–60 to +120	mA

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NOTES:
1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability. No terminal voltage may exceed V_{CC} by +0.5V unless otherwise noted.
2. Input and V_{CC} terminals only.
3. Outputs and I/O terminals only.

PIN DESCRIPTION

Pin Names	Description
A_0, A_1	Address Inputs
$\overline{E}$	Enable Input (Active LOW)
$\overline{O}_0$ - $\overline{O}_3$	Outputs (Active LOW)

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FUNCTION TABLE(1)

Inputs			Outputs			
$\overline{E}$	A_0	A_1	$\overline{O}_0$	$\overline{O}_1$	$\overline{O}_2$	$\overline{O}_3$
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	H	L	H	L	H	H
L	L	H	H	H	L	H
L	H	H	H	H	H	L

2566 tbl 02

NOTE:
1. H = HIGH Voltage Level; L = LOW Voltage Level; X = Don't Care

CAPACITANCE (T_A = +25°C, f = 1.0MHz)

Symbol	Parameter(1)	Conditions	Typ.	Max.	Unit
C_{IN}	Input Capacitance	V_{IN} = 0V	6	10	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	8	12	pF

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NOTE:
1. This parameter is measured at characterization but not tested.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:
Commercial: T_A = 0°C to +70°C, V_{CC} = 5.0V ± 5%; Military: T_A = –55°C to +125°C, V_{CC} = 5.0V ± 10%

Symbol	Parameter	Test Conditions(1)		Min.	Typ.(2)	Max.	Unit
V_{IH}	Input HIGH Level	Guaranteed Logic HIGH Level		2.0	—	—	V
V_{IL}	Input LOW Level	Guaranteed Logic LOW Level		—	—	0.8	V
I_{IH}	Input HIGH Current(4)	V_{CC} = Max.	V_I = 2.7V	—	—	±1	µA
I_{IL}	Input LOW Current(4)	V_{CC} = Max.	V_I = 0.5V	—	—	±1	µA
I_I	Input HIGH Current(4)	V_{CC} = Max., V_I = V_{CC} (Max.)		—	—	±1	µA
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_N = –18mA		—	–0.7	–1.2	V
I_{OS}	Short Circuit Current	V_{CC} = Max.(3), V_O = GND		–60	–120	–225	mA
V_{OH}	Output HIGH Voltage	V_{CC} = Min. V_{IN} = V_{IH} or V_{IL}	I_{OH} = –6mA MIL. I_{OH} = –8mA COM'L.	2.4	3.3	—	V
			I_{OH} = –12mA MIL. I_{OH} = –15mA COM'L.	2.0	3.0	—	V
V_{OL}	Output LOW Voltage	V_{CC} = Min. V_{IN} = V_{IH} or V_{IL}	I_{OL} = 32mA MIL. I_{OL} = 48mA COM'L.	—	0.3	0.5	V
V_H	Input Hysteresis	—		—	200	—	mV
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max. V_{IN} = GND or V_{CC}		—	0.01	1	mA

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NOTES:
1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 5.0V, +25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the short circuit test should not exceed one second.
4. The test limit for this parameter is ±5µA at T_A = –55°C.

POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions[1]		Min.	Typ.[2]	Max.	Unit
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	V_{CC} = Max. V_{IN} = 3.4V[3]		—	0.5	2.0	mA
I_{CCD}	Dynamic Power Supply Current[4]	V_{CC} = Max. Outputs Open One Bit Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND	—	0.15	0.3	mA/ MHz
I_C	Total Power Supply Current[6]	V_{CC} = Max. Outputs Open f_0 = 10MHz	V_{IN} = V_{CC} V_{IN} = GND	—	1.5	4.0	mA
		50% Duty Cycle One Input and One Output Toggling	V_{IN} = 3.4V V_{IN} = GND	—	1.8	5.0	
		V_{CC} = Max. Outputs Open f_0 = 10MHz	V_{IN} = V_{CC} V_{IN} = GND	—	3.0	7.0[5]	
		50% Duty Cycle One Input Toggling on Each Decoder Two Outputs Toggling	V_{IN} = 3.4V V_{IN} = GND	—	3.5	9.0[5]	

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NOTES:
1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V). All other inputs at V_{CC} or GND.
4. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
5. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
6. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_0 N_0)$
   I_{CC} = Quiescent Current
   ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
   D_H = Duty Cycle for TTL Inputs High
   N_T = Number of TTL Inputs at D_H
   I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
   f_0 = Output Frequency
   N_0 = Number of Outputs at f_0
   All currents are in milliamps and all frequencies are in megahertz.

SWITCHING CHARACTERISTICS OVER OPERATING RANGE

			FCT139T				FCT139AT				FCT139CT				
			Com'l.		Mil.		Com'l.		Mil.		Com'l.		Mil.		
Parameter	Description	Condition[1]	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.	Unit
t_{PLH} t_{PHL}	Propagation Delay A_0 or A_1 to $\overline{O}_n$	C_L = 50pF R_L = 500Ω	1.5	9.0	1.5	12.0	1.5	5.9	1.5	7.8	1.5	5.0	1.5	6.2	ns
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to $\overline{O}_n$		1.5	8.0	1.5	9.0	1.5	5.5	1.5	7.2	1.5	4.8	1.5	5.8	ns

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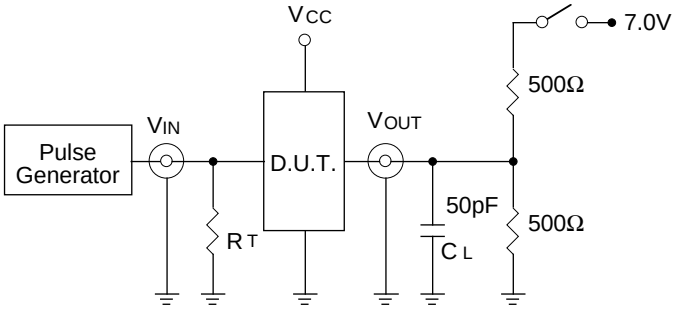
NOTES:
1. See test circuit and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.

TEST CIRCUITS AND WAVEFORMS

TEST CIRCUITS FOR ALL OUTPUTS



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SWITCH POSITION

Test	Switch
Open Drain Disable Low Enable Low	Closed
All Other Tests	Open

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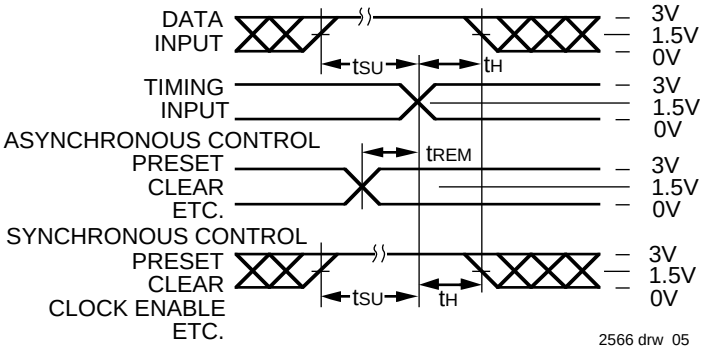
DEFINITIONS:

C_L = Load capacitance: includes jig and probe capacitance.

R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

SET-UP, HOLD AND RELEASE TIMES



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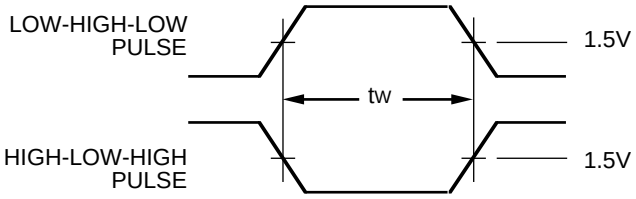
PULSE WIDTH



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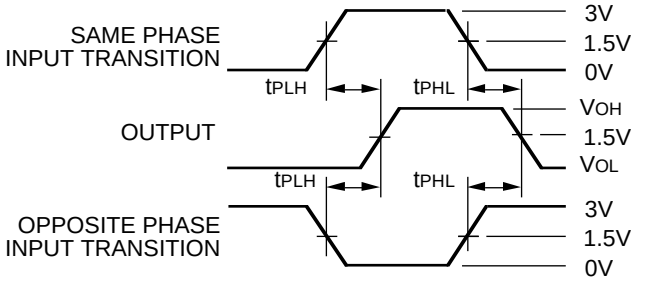
PROPAGATION DELAY



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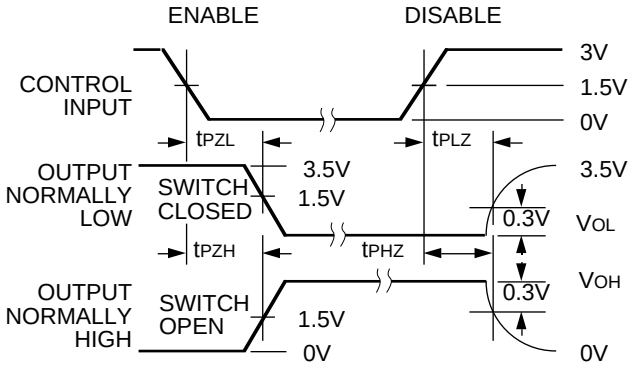
ENABLE AND DISABLE TIMES



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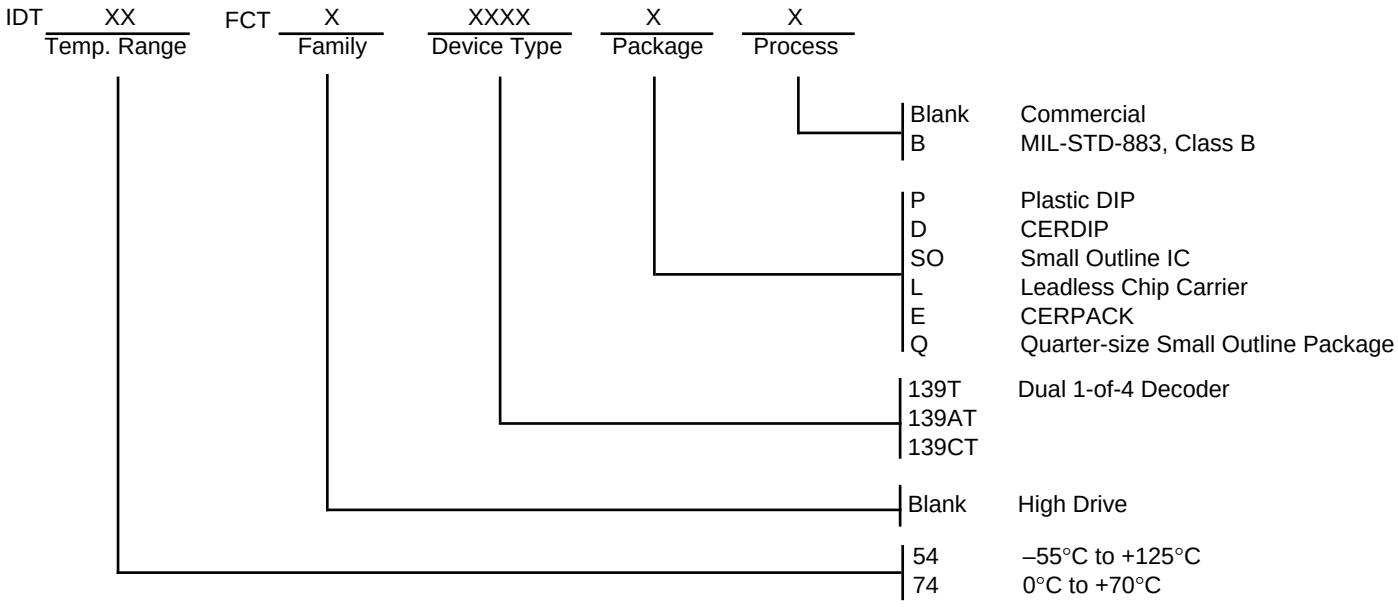
NOTES:

1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH
2. Pulse Generator for All Pulses: Rate ≤ 1.0MHz; t_F ≤ 2.5ns; t_R ≤ 2.5ns

ORDERING INFORMATION



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